The

AUSTRALIAN MODEL RAILWAY ASSOCIATION

"JOURNAL"

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A.M.R.A. GUIDE TO THE BEGINNER.

By D. GROSS.

As a beginner in this fascinating hobby of building a model railway, you, no doubt, are seeking guidance from every possible source, as to how to get started.

Because human nature makes us all different, there are many angles to the development of this hobby and each of us, regardless of his makeup, can find something to invite his interest.

The Australian Model Railway Association, has always been interested in the new-chum, and for this reason the following facts have been compiled.

The first and major problem confronted by a person anticipating entry into the hobby is the choice of gauge. A prime factor to the solution of this problem is the area available in which to build the railway.

To illustrate the importance of area with regard to the gauge to be decided upon, we will, in turn, make known the main gauges in use today.

"O" Gauge is $1\frac{1}{4}$" gauge, that is $1\frac{1}{4}$" between rails.
The popular scales in use on this gauge are $\frac{1}{4}$" = 1 ft. and 7mm = 1 ft, with some at 17/64" = 1 ft.

"S" Gauge is .875" ($\frac{7}{8}$") gauge and a scale of 3/16" = 1 ft.

"00" Gauge is 16.5mm gauge in England and a scale of 4.0 mm = 1 ft.
In America 19.0mm gauge to a scale of 4.0mm = 1 ft.

"HO" Gauge is 16.5 mm gauge and a scale of 3.5 mm = 1 ft.

"TT" Gauge is 11.95 mm gauge and a scale of 1/10" = 1 ft.

The determining factor in each case is the minimum radius to be used on the layout. In "O" gauge, the recommended minimum radius os 3 ft, but in practice it is found that to achieve good operation, large r curves should always be aimed at. The average main line curve in "O" gauge is about 5 ft to 6 ft radius, therefore to allow for clearances etc., a room of not less than 10 ft in width, should be available for "O" gauge.

The minimum radius recommended for "S" gauge is 2 ft; for OO/HO, 18 ins; and for TT, 16 ins; however as in "O" gauge, these minimums are absolute, and should be increased where possible.

Similarly the length of room will effect the gauge you use, as it takes 4 times the area, in O gauge as it would take to build the same layout, in H.O. gauge. The length of trains, the length of sidings and the length of run, are all major considerations.

Having decided upon the gauge you will use, and designed your layout, you will then have to decide upon the method of propulsion. As steam and clockwork are readily understandable as forms of propulsion we will just outline the main methods used on electrically operated model railways. These are as follows:

Two Rail, which provides the most realism in trackwork for modelling steam type motive power, has as its main features the elimination of a third rail and the lack of dead spots in points and crossings. At least one wheel on each axle on all locomotives and rolling stock must be insulated so that no current can flow from rail to rail, as a short-circuit. As its name implies, it uses the two running rails to carry the current, therefore the rails must also be insulated from each other. This, however, is consequent to the present day trend in track laying, using fibre or wooden sleepers. Insulated wheels for use on two-rail are available, and whilst they cost a little more than non-insulated ones, the cost is outweighed by the cost of and time spent on three rail.

Stud Contact, is the nearest approach to two-rail in appearance, in the three rail system. Small nails or pins are driven into sleepers, between the rails so that they project about 1/16 ins. above sleeper level and are spaced evenly apart. Each stud is connected to a feeder cable and operated as a third rail. A shoe or skid is fitted under the loco and of sufficient length to maintain contact with at least one stud whilst the loco is in motion. The studs if painted a dark colour are very unobtrusive and it is possible to mistake stud-contact for two-rail.

Three rail can be in the form of a centre third or an outside third rail. Both require extra rail to complete the electrical circuit, which gives the track an unreal appearance, when used with steam outline locos. Centre third is usually used in tin plate three rail train sets and is well known. Third rail requires gaps at points etc, thus causing possible uneven running and bad contact at these places, if not laid properly.

Overhead contact is natural for those interested in modelling from prototype, railways using this system. It requires ingenuity in design of overhead gear and pantographs, but can be made very attractive and practical.

All these methods have been tried and proved and are in use today, but as a guide, we may point out that 2-Rail is rapidly taking in "HO", "OO"; "S" and 0 gauges whereas Stud Contact seems best suited for only gauges larger than "HO/OO".

When a decision has been reached regarding the type of pickup to be used, it is then necessary to decide upon the voltage and type of power to be used. It is generally accepted here, as in most countries, that 12 volts DC or 16-18 volts AC be used as operating voltage for gauges up to "O" gauge. However, most motors in use are capable of taking a few extra volts when required so that any slight variation above the recommended voltages is quite harmless and often an advantage, especially when using a transformer as initial power source, for a transformer allows the voltage to drop upon load.

Direct Current (D.C.), in general, offers better control of motors than Alternating current (A.C.) and does offer perfect reversing by use of permag motors and polarised relay operated reversing mechanisms. For running locomotives, D.C. is now accepted as the most convenient type of power.

The source of Power is of prime importance and the various types are explained as follows.

Transformers are used when reducing high voltage A.C. to a low voltage A.C. such as 240 volts to 18 volts. If you intend to operate on A.C., a transformer of suitable output, say 18 volts A.C. rated at about 6 to 8 amps should be sufficient for an average "O" gauge layout, and about half that amperage for a "HO/OO" layout.

If you intend to use D.C., then add a rectifier to the power pack on the low voltage side of the transformer. This rectifier should be of sufficient capacity to withstand the full load of the transformer. Selenium rectifiers are preferred for model railway use as they are reliable and capable of taking a lot of abuse without burning out. Another source of D.C. are accumulators, such as common car batteries. These are in theory the best source of D.C. but in practice require much attention such as charging and topping up and therefore not too popular amongst the modelling fraternity. Dry cell batteries are to be avoided for propulsion of trains owing to their short life and expense incurred.

The matter of expense is a governing factor in the final selection of gauge and power supply, and a new recruit to the hobby will do himself a major service by inspecting the range and prices of goods available in the various gauges and to try to estimate the parts that can be made by himself, before the decision is reacted.

When all these problems have been juggled and the decisions made, it is very important to follow the standards set for your gauge and scale. By so doing you get a correct basis for building; developed by experience of others. In this way you benefit by their mistakes, and at the same time, produce something that will operate satisfactorily. Also it assures the interchange of equipment between different model railways, which at first may not seem important, but the time will come when you will want to take your equipment to a friends place or invite him over to run his equipment on your track. Again, you may want to sell or trade equipment with someone, and unless the cars have the same standards, they will not run together.

The A.M.R.A. has set Standards which are having a great influence on this hobby in Australia and are recognised by all leading clubs and manufacturers as well as modellers, as being the means of putting everyone on the right track. These Standards are issued to all members upon joining so that all may benefit, from the old hand, to the keen, yet puzzled, beginner.

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To the Editor:

Please prevail on Claude Henderson to elaborate on his article about Powelltown and any other timber tramways. This type of article, which covers an unusual facet of the railroad world is just what the doctor ordered. Personally I would like to know:--

(a) How logs were moved to the rail head prior to the introduction of motor vehicle haulage.

(b) How logs were loaded onto log buggies.

(c) What are the basic components of a small old time saw-mill.

How about a few drawings of timber bogies and loading installations?

Also to Rick -- Why spoil a good item such as Review with this "zombie" gibberish? If you are short of material then let's have a cut-down review. Past issues have been excellent.

Dick (Crankpins) Gutteridge.

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SOME MORE ON GLOBE PROTECTION AND A BIT ABOUT A "THROTTLE".

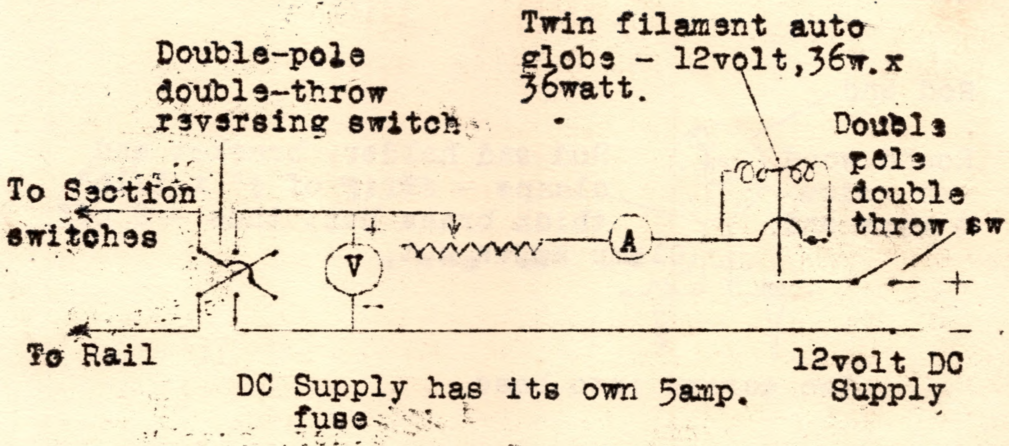
by REG. STRINGER.

Couple of years ago Ern Mainka explained to me his idea of using Auto globes to protect the D.C. supply equipment. Later, I saw it in Dave Gross's upstairs H.O. Rly. just before he shifted down to more temperate regions, and then I saw Ern's rigout.

I, also use it on the T.H.R. but the details differ. About 18 months ago, Xmas 1953/54, the C.E.E. (Colin Steele) and his family were holidaying here and, having good volt and Amp. meters on hand, he conducted some tests. The 12 volt 3 amp. Westinghouse Battery Charger actually registered 7 amps when the ammeter was put across it for a few seconds. Some % load safety margin, and did not blow the fuse! I had by then told Colin of Ern's idea of globes and he remarked "If you had a 36 watt globe, it alone should be sufficient to protect this supply unit." Well, of course! Volts x Amps = Watts, and 12 x 3 = 36, so I produced a headlamp globe ex the motor car that had forsaken one of its twin 36 w. filaments. The tests went along satisfactorily and a circuit drawn out as in Fig. 1. Later, however, when the installation of the panel and controls was nearing completion I put in a new globe with both filaments connected in parallel, and this has been in use for about 12 months. I find that, "opening the throttle", with a dead short on the track, the filaments just begin to glow at 1.5 amps and a few volts. With throttle wide open, both filaments are at full brilliance, of course, and the amperage is 3.6. I propose to alter the wiring to the lamp so that one filament is used at a time till it burns out or is broken and then change to the other. Two terminals and a wander lead will do the trick, or a S.P.D.T.switch. This should break down that 3.6 amps on a dead short but I'll have to ascertain if enough current gets thru to the locos.

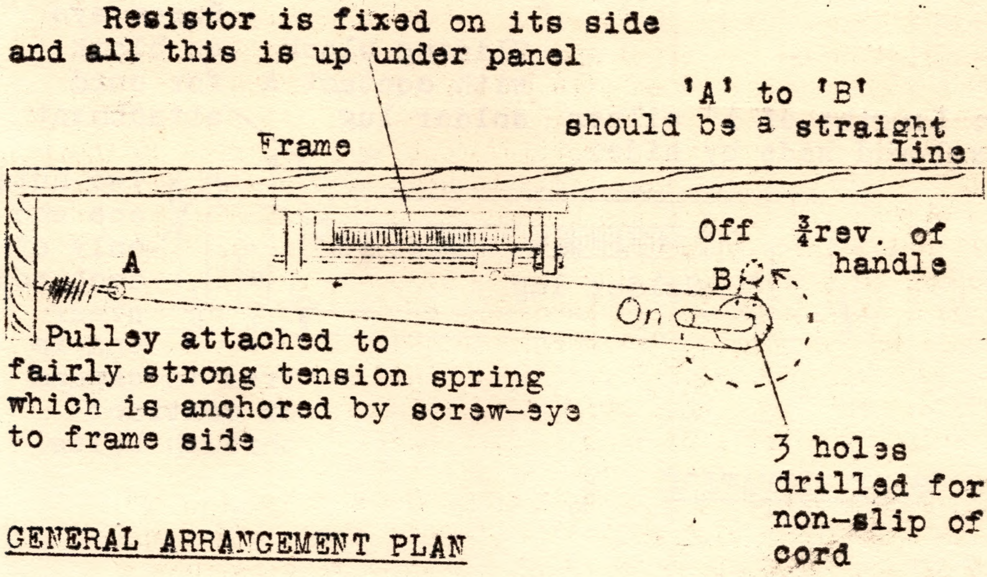
So far there is a Bassett-Lowke 0-6-0 T and two "B" Class Diesels ex Alan Shorter's Phoenix Works, and a spare set of bogies for same on which I propose to construct a Fairbanks Morse superstructure. With the present set up,

FIG.1



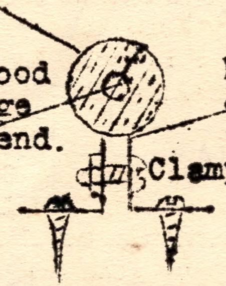
CIRCUIT OF ARRANGEMENT

FIG.3

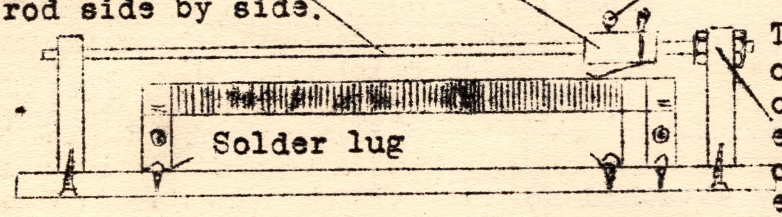


GENERAL ARRANGEMENT PLAN

FIG.2


Rod end
Round wood
-en wedge
& wire end.
Rod end holder, bracket and
clamps - strip of ½" x 1/16"
thick brass bent thus - 2 off.
Clamp ~~screw~~ nut.
Two screws into base

END VIEW OF ROD MOUNTING



SIDE ELEVATION

the 0-6-0 T never draws more than about .5 to .6 amps and the "B's" move themselves on the level without load at .6 amps and 3 to 4 volts. That's all the data I've noted so far regarding juice drawn by the locos. I'll try some more tests later when the "attic" is not so "arctic" -- P.D. cold in the Winter and too big a job to insulate or centrally heat.

The "Controller Rod" was designed and made by Colin. He procured a radiator rod from Mica & Insulating Supplies Co.P/L. of 566 Bourke Street, Melbourne, for a coupla bob. Not having a grinding wheel handy he used a heavy file and produced a narrow flat surface straight along from end to end. "Flat" is not quite correct, but he broke off the highest part of the "thread" so that a contact-slide could rub along the wire when wound on. The resistance wire, from Liverpool Electric Cable Co. Ltd., 586 Bourke Street, is EUREKA 24 G. Coupla more bob bought 40 ft. of it, but I understand he used 38 ft. and the rod's resistance is 21 ohms. Winding the wire on the rod was begun by using a small round wooden wedge to jam the wire in the hole in the end of the rod. When wound, the other end was held in similar manner till rod was ready to mount. When mounting, a few turns were undone from one end only, and fastened down to base and thus left about ½ inch of bare rod for contact slide to sit on, in "off" position. I wanted a compact, straight-sliding type of controller or resistance, and this looked like IT, with small and even variations of resistance as the slide was moved along. It's a honey, nice feel and sweet and sure in operation, and looks like an everlasting job. Have not noticed it "glow" hot yet. All the handle end of the affair was built up of Bits and Pieces in the T.H. shops and the drum turned from a suitably grained piece of wood. The most satisfactory "Motion transmitter" between the handle and the rod turned out to be the cord used in Venetian blinds. There was a snag here, though, the cord slipped in the groove of the drum. This was fixed by drilling 3 holes in the drum. Two holes, about 1 inch apart were drilled from bottom of groove in drum, on an angle, one to each side, and the third hole straight thru from side to side, but between the first two. The cord was threaded thru one hole in groove, out the side, thru the centre hole to other side and back into groove thru the last hole. The cord passes 1½ times round the drum. The rod is about 12 inches long, the drum approx.

4 inches in diameter and the handle moves thru $\frac{3}{4}$ of a rev. from "off" to "full on". Figs. 2 and 3. Next panel to be built and connected to main line is to have two similar rod type resistors but the slide will be moved by a lever moving back and forth.

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"THE FLYING FLEA."

By NOEL NASH.

From our Queensland Branch comes this welcome and interesting little story on a fragment of the vast flung railways of our immense Northern State, a system that --- irrespective of its gauge of only 3'6" --- did an outstanding job during the war years, as today it does a mighty peace-time job. ---------Ed.

Many of the trains in Queensland are known by particular names such as the "Sunshine Express" and the more recent air-conditioned trains the "Sunlander", "Inlander", "Midlander" etc., but others are unofficially, and affectionally, known to the local inhabitants by names such as "The Scooter" "The Peanut" and last but by no means, least "The Flying Flea".

"The Flea" as it is more commonly called runs from Charleville to Quilpie on Wednesdays and Saturdays and returns on Thursdays and Sundays connecting with the "Westlander" which runs between Brisbane and Cunnamulla.

The composition of the "Flea" is two Coaches, two parcel wagons and a van. The coaches are CLs or Composite Lavatory and are an ancient end verandah type with first and second class compartments in either end separated by lavatories in the centre. Each compartment has interior water tanks and these are iced in the hotter summer months. Parcels are loaded in a CJFP, (louvred box wagon) and a CR (refrigerated) wagon both adapted for fast passenger trains and the van is a CLV (Compo Lavatory Van) with first and second class compartments and of course a Dog box. The total weight is calculated at just under 100 tons and is drawn by a PB 15 class engine of 2-6-0 design. Enginemen prefer engines with the Stevenson link motion on the fast timetable of "The Flea" because it is not as top heavy and does not roll as much as those equipped with Walschearts valve gear. A fond opinion of the crews is that if ever "The Flea" jumped the rails there would be no need to get the break-down cranes out. All that would be necessary would be a bulldozer to fill in the hole.

The distance between Charleville and Quilpie is 138 miles and the running time is 4 hours 54 minutes. When you consider that the whole distance is laid with 42 lb rails on which Queensland has a 30 M.P.H. restriction the trip is a fast one.

The "Westlander" arrives at Charleville at 3.17 pm and there is a wait of some 45 minutes before "The Flea" is loaded from the parcels, mail, small goods and milk which are transhipped from the "Westlander". During this time the traveller has time to take stock of Charleville. First impressions of a town to train travellers is the railway station and first impressions of Charleville is quite a surprise. The Stationmaster's, Parcels and Booking Offices are accommodated in a few bondwood huts and weatherboard building. The station was burnt down about twelve months ago and the tenders for building the new station closed last month. It is to be a brick and concrete building of the latest design.

Charleville is a typical western town built on the eastern bank of the Warrego River with a population of about 4,000. It has an all weather Aerodrome and is a base of the Royal Flying Doctor Service.

"The Flea" leaves the platform at 4.15 pm and the journey commences. Out of the town reaches we get a move on travelling through Cyprus pine country with stunted timbers in red sandy soil. We are heading south and the sun is shining through the windows for it is too hot with the shutters up and the breeze with the windows open does not make the sun very unbearable. It is hard to take after the Air-conditioned "Westlander" with the 68 degree temperature and inside cleanliness but at Westgate, the junction for the Great Western Railway, we head west into the setting sun and the situation eases a little.

There is a short stop at Warrego River for water and locomotive purposes thence on through flat sparsly timber country on which sheep pick up a meagre feed but never-the-less grow good quality wool. An occasional station homestead looks like an oasis in the desert and their produce is left at small shelter sheds along the route and Myendetta is one of them.

Next stop is Wanko and more parcels and mail are left in the shelter shed. In one corner of the waiting room is a makeshift Tea Bar. Water is boiled on a primus stove but no doubt the scones are baked in one of the houses nearby. Wanko is also the end of a Staff section and so the tablet is changed.

After a quick stop at Nimaru, Vinegar Hill and Loddon for parcels and mail, (sometimes a passenger for one of the local holdings also alights but the majority of station people travel by car) Cooladdi is reached. In the 2½ hours since leaving Charleville 62 Miles has been travelled and at Cooladdi another cup of tea, sandwich, scone or pie can be bought at the stall on the platform while the engine fire is cleaned, motion oiled and tender filled. The Guard, of course, has mail, parcels of bread and beef to unload into the office. Cooladdi is the first station after leaving Charleville where there is anyone in charge although it is a Station-mistress. She is the wife of the Ganger in charge of this length of permanent way.

24.[illegible] mph

The Post-Office-store-boarding-house, school and three or four houses is the first sight of any town west of Charleville though some of the homesteads with their various outhouses, woolshed and shearing quarters look much bigger than most towns.

At Yalamurra, ten miles further on, more parcels, mail and perhaps a passenger are left in the shelter shed to be picked up by a station car when they hear "The Flea" go past the homestead boundry. These people don't waste time waiting for the train unless they have some errand connected with waiting.

At Cheepie there is another stop for loco and in that ten minutes mail and parcels are unloaded into the office by many willing helpers. Cheepie is a railhead for Adavale and this probably keeps the place going. There is a hotel of a sort, several houses and a Post Office-store. The country is more open now and there are a few small ridges to break the flat monotony. The electric lights in the coaches are switched on before leaving Cheepie in summer though in winter they would be required at Wanko.

The next stop is Winbin if there is a passenger or any parcels to be set down otherwise it is at the 600 mile Camp. This is a Fettling Gang camp only, and they get their mail and foodstuffs sent out from Charleville or Quilpie on the return trip.

Twenty miles further on the lights of Quilpie are seen and at 9.35 pm we pull into the platform and alight.

Quilpie has a population of some 2½ thousand and is more or less a modern town. It has electricity and hot water laid on and the town area is completely sewered. The water at the bore head has a temperature of 180 degrees and a pressure of 115 lbs per square inch but all over 35 lbs is allowed to flow away. Sheep and cattle are the chief industries and keep the town prosperous. The goods railed from Quilpie is mainly wool amounting to some 7000 bales per month. Cattle for the abattoirs probably about 8000 per month in the season and sheep would average 15 to 18 thousand head per month. Goods received each month totals up to 1000 tons, so "The Flying Flea" serves a prosperous district and does not have any monopoly on the Great Western Railway.

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ALL-MODELS EXHIBITION.

As this edition of the Journal goes to press various members are working on the AMRA stand at the Exhibition Buildings. Work is well advanced on a very large stand.

WOULD ALL MEMBERS, WHO HAVE AGREED TO LEND THEIR MODELS FOR THE DURATION OF THE SHOW, PLEASE BRING THEM TO THE EXHIBITION BUILDING NEXT WEDNESDAY NIGHT, 24/5, OR NOTIFY THE GROUP WHEN THEY CAN DELIVER THE MODELS. EACH MODEL MUST HAVE ITS OWN VALUATION FOR INSURANCE PURPOSES. DELIVER MODELS TO FRANK A'VARD OR THE GROUP AT THE EXHIBITION. PLEASE MAKE EVERY ENDEAVOUR TO DISTRIBUTE THE DODGERS SENT WITH THIS COPY OF THE JOURNAL, THANK YOU.

SOUTHERN STATES RAILWAY (Part 5)

Continued from page 57, May /55 issue.

Now we come to SAFEWORKING. I am very interested in signalling, but owing to the unusual set-up of this layout with its different levels, some parts entirely out of view, some track indoor, some outdoor, so there wasn't much scope for proper signalling as on full size railways.

I thought that using 3-position automatic semaphores would be too delicate outdoors, and the color light type are useless if you can only see the backs of them. Similarly, in the yards which (are indoor) , it is difficult to show the condition of the points by means of ground signals because these are often hidden by vehicles and also the points themselves are not visible on the higher level yards. I suppose the reader is asking "then what the H--- is visible on this layout".

It was decided then to put all the safe-working on an illuminated diagram board and put color-light signals only where they could be seen from the front. The board indicates to the operators which block is occupied and the condition of the points at the 3 stations. It is mounted on the wall in front of the operators who can tell at a glance what's what on the whole system.

Now for the construction of the board. A sheet of good quality plywood ⅛" x 16" x 5 ft was nailed to a frame of 3" x ½" timber and given a couple of coats of blackboard black paint. The next requirement was a track diagram through which a spot of light was to show but which was to entirely disappear when the lamp is out, thus showing a clear track.

Now refer to Fig. 1. A run-around loop, a turn-out and a cross-over is shown for example. (The actual board is covered with diagrams). Where you see the dots a red spot shows according to how the points are set. A clear road shows no light or marking at all.

Next, the yards, sidings and wherever there is a point was drawn on the board in lines ½" wide as in Fig. 1. Each station being treated as a separate group. Then 5/16" holes were drilled in the ply on the trailing side approaching each point. Next the diagram was again drawn on white (not frosted) celluloid and this was cut out and stuck onto the appropriate spaces on the board covering up the holes. Each point is lettered A B C to agree with correct lever in the lever frame.

We now have a clear picture in black and white which looks something like prototype. Next thing is to mount 3 v. pea lamps behind each hole in a suitable position and also preventing stray light getting to the wrong hole. Refer to Fig. 2, an exploded view, "B" celluloid, "A" ply panel, "C" a ½" thick block of wood with a ½" hole drilled through, "D" clip contact bent up from springy phosphor bronze wire, "E" pea lamp, "F" flat spring contact also keeps the lamp in place.

There are about 60 lamps requiring 62 wires to be connected to the board, so I used eight 8-pin loudspeaker plugs and sockets to facilitate removal of the board if necessary. The lamps are lit by a specially made transformer and are operated by contacts at the point itself. The red color is obtained with a piece of cellophane between the lamp and celluloid. Note that in the case of the cross-over, if the points are set for crossing over, two lamps wired together show on the straight tracks. And if the points are set straight ahead on each track, the lamp in the cross-over lights up and indicates you can't cross over from either direction.

Coming now to main line signalling. Normally, one would use track circuits with sensitive D.C. operated relays to protect single line sections. In my case because most of the main lines are out-door, I found that dirt on the track caused the relay contacts to quiver, thus causing the signal lamp to flicker which didn't look good and also as stated before, the two rails were needed for good traction supply. After a lot of thought it was decided to use track contacts operated by the loco pick-up shoe at each end of each section.

An occupied section is indicated by an appropriate orange colored light on the diagram board, and also where possible, a few two-position color-light signals at the track side where they would be visible to the operator. Of course, where this system falls down is the fact that it wouldn't indicate occupation by any part of a train becoming detached en route. Looking at Figure 4 it looks a cumbersome and complicated method, but actually it is very simple and really works. It must be

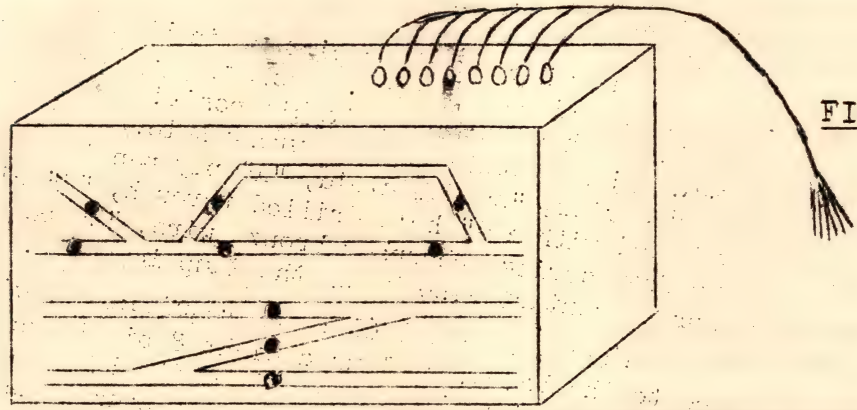

FIG.1

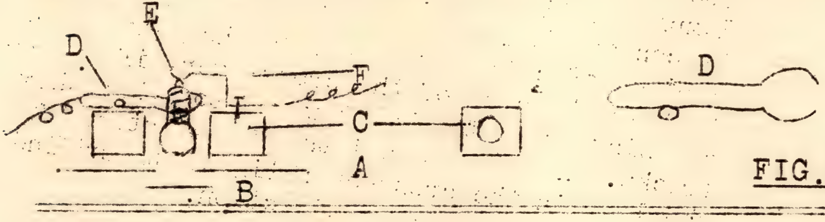

FIG.2

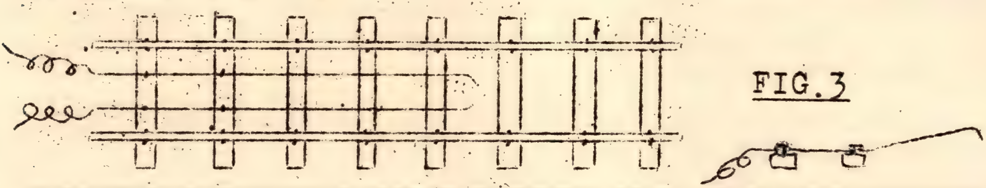

FIG.3

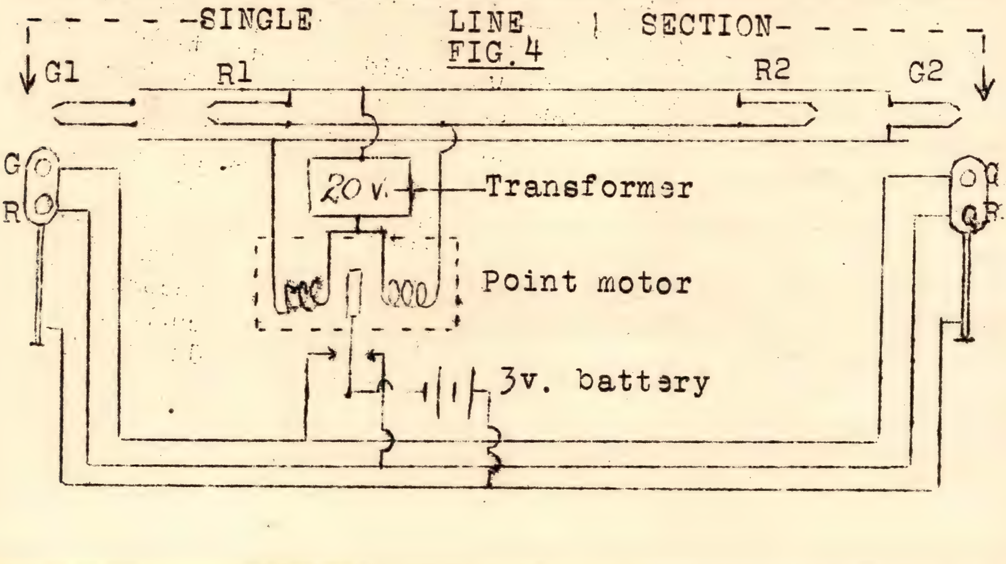

FIG.4

remembered also, the signalling circuit is entirely electrically isolated from the traction current, which is a desirable thing.

Starting with the track contacts, Figure 3, Four brass brads are driven into the sleepers, and to the brads are soldered some six inches of springy phosphor bronze wire bent as shown and slightly lower than railhead. The idea being that the loco pick-up shoe touches the two pieces of wire acting like a momentary switch. To each section there are four lots of these contacts, 2 at each end. Refer to figure 4 "single line section" shows 4lots of contacts (track not drawn for clarity). Assuming a train travelling from left to right and the signals at each end showing green and the section is unoccupied, it contacts G1. but nothing happens because the signal is already green, next it contacts R.1. and the signal goes to red; then the train next contacts R.2 and nothing happens, then as it leaves the section contacts G.2. putting the signal back to green. The same sequence happens when the train is travelling in the other direction. Referring to figure 4 again the basis of the whole thing is a double solenoid point-motor. The point-motor (powered by a twenty volt transformer) is switched back and forth according to the track contacts. The throw-bar of the point-motor closes and opens contacts which operate the appropriate signal lamps. The lamps being lit from a 3 v. dry battery. The foregoing is repeated for each single line section you wish to protect. There is no automatic stopping of trains or such rubbish, the driver must drive according to the signals, and provided he isn't drunk there won't be any accidents. Those who are electrically minded can have a glorious time with thousands of wires necessary with this system. Just think how you can stagger the visitors when you invite them to look under the bench.

This now completes the description of the Southern States Railway as far as I've gone and there now remains scenicing and buildings to be done. I'm afraid I'm not very good at this sort of thing, my ability is limited to sticking brick-paper to cardboard. If there is anything I've left out, write to Mr. Editor and I will attend to it.

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CARDBOARD BUILDINGS FOR OO AND HO.

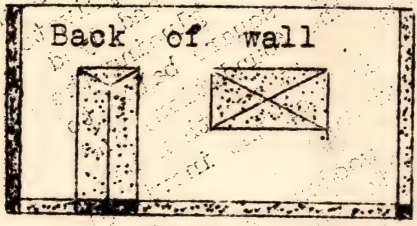
PART 11.

The Use of Brick Paper.

Brick paper used exactly as is, is a rather uninteresting material for walls and since most model buildings are viewed from the top anyway, the builder is advised to select a design which offers a complicated roof plan. If the design of the building necessitates a simple roof, then avoid plainess by adding extra detail, such as, hot water storage tanks, air and sewage vents, sky-lights, wireless aeriels or finials. (The spiked knobs found at each end of old-fashioned roofs) If imitation galvanised iron is used, try patches of rust or one bright sheet on an otherwise discoloured roof.

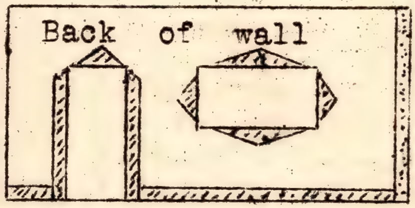
The application of the brick paper itself is an easy job, provided a few simple rules are followed. Assuming that the sides of the building have been cut to shape with door and window openings removed, the first step is to coat one of the walls with spirit gum. Paste is not suitable for this job because it quickly soaks into the brick paper, and if the paper has to be adjusted it tends to distort or tear. The glued wall is placed face down on the brick paper, so that the top edge of the wall lies exactly along the top edge of the paper. Trim roughly around the outline of the wall about ¼" out from its edges with a sharp razor blade.

Turn the wall over so that the bricked surface is uppermost. With a piece of clean cloth, preferably linen, rolled into a ball, gently rub the brick paper in a spiral motion starting from the centre of the wall. This should remove air bubbles or creases. If it doesn't, peel the paper off the wall to the point where the trouble is located, and with the finger gently ease the paper back onto the wall, pressing out the offending bubble or crease, and repeat the smoothing. Carry out this process with all the walls, and then clean the glue from window and door openings with the end of a match. Leave the walls to dry thoroughly, and then we are ready for the next step. This is the forming of the brick paper round window and door openings. There are two methods of cutting employed here, but in both cases the cuts are made from the back of the opening. The cuts are shown in figs. 1 and 2 below.



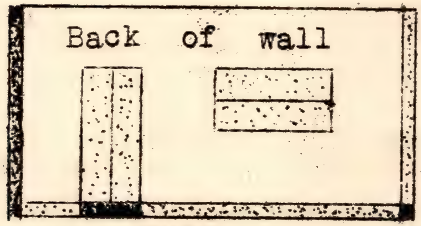
Cuts

FIG. 1



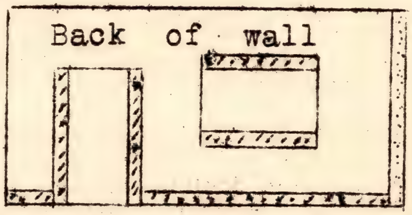
Flaps folded back

FIG. 1a



Cuts

FIG. 2



Flaps folded back

FIG. 2a

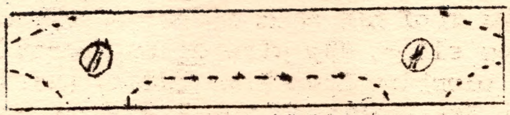
The type of cut used for thin walls, is shown in Fig. 1. The black sections are cut away and the flaps pulled through the opening, glued, and pressed down. If this method was used on thick walls, then large patches of cardboard would show. To obviate this, the type of cut used in Fig. 2. is used. This requires that small rectangles of brick paper should be glued along the top of the door openings and down the sides of the window openings to give the appearance of a thick brick wall.

The small strips of brickpaper left on one edge of each wall are the overlaps to hide the joints when the walls are glued together. The final step before assembly of the walls, is to fit windows and doors. The construction of these was described in the first article of this series, as was also the assembly of the finished walls. After assembly the overlap mentioned is folded round the corner. Form the creases with the back of your scissors to obtain a sharp corner. Glue the overlap and press it down. The joint should not be obvious, but if it is, then glue a down pipe from the roof guttering at this point. If the roof has been added and all external details such as window sills, fly-wire doors, porch lights and particularly the plumbing have been added, the house is ready to be placed on its site. If the layout is sceniced, try and locate the building on a slope. The result is much more effective. To do this some form of foundation is necessary. If the building is brickpaper covered, the foundation will consist of $\frac{1}{8}$" balsa wood, covered with the same brickpaper as the walls, or in the case of an old building where weathered brickpaper is used for the walls, try an imitation bluestone or random rubble paper. To fit the foundation onto the site, use paper patterns to obtain the contour of the ground. Transfer this pattern to the $\frac{1}{8}$" balsa cut the outline with a sharp razor blade and then cover the balsa with the building paper. Glue the balsa foundation onto the site, and then use a sanding block to gently sand the top of the foundation horizontal. Do not forget to model the continuations of down pipes, plumbing etc., on the foundation. Build steps up to the doors, and if a private house, use coffee grounds to imitate garden beds and dyed sawdust for lawns. Do not make the mistake of glueing the building down onto the foundation. Use $\frac{1}{8}$" square balsa to construct a framework to fit down into the foundation, and glue this onto the floor of the building. It can then be removed at any time for cleaning or in case of the inevitable reconstruction of the layout moved elsewhere.

If the building is an imitation of a wooden covered structure, square balsa strip can be used to imitate foundation stumps. These are let into the ground and glued. When set they are planked with balsa strips a scale 6" wide to imitate the barge boards. A framework can be constructed to sit inside the stumps so that this type of building, will also be removeable.

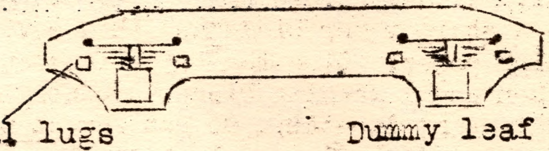
If the building is an industrial type or at all ancient the brickpaper walls can be finished with a water colour wash to the degree of dirtiness you wish.

The above account attempts to cover the elementary techniques of this subject. For further details and more ambitious work, the reader is referred to what might well



Sides bolted together,
marked out then shaped together

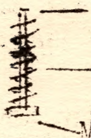
1st STAGE



Metal lugs
soldered on

Dummy leaf spring casting
soldered on, also solder on
journal box

2nd STAGE

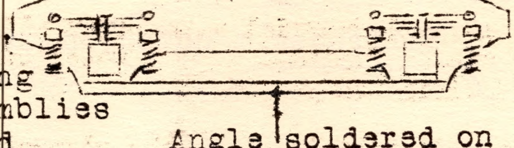


18 gauge wire spring link

Suitable spring

Metal washer

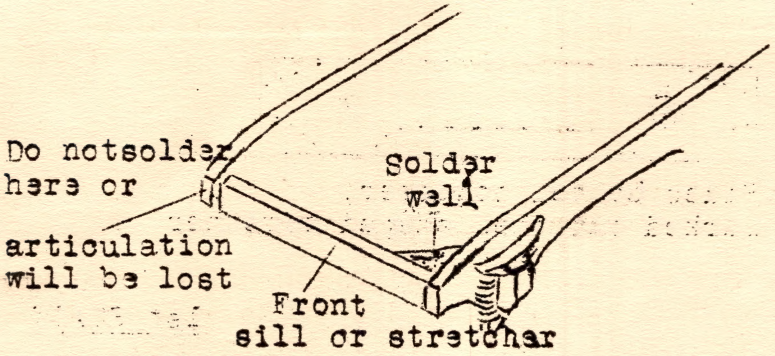
SPRING ASSEMBLY



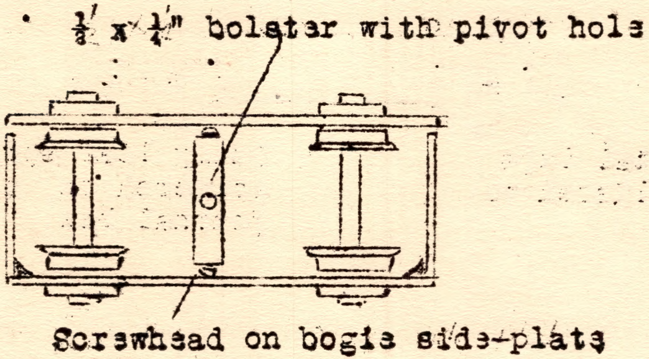
Spring
assemblies
added

Angle soldered on

3rd STAGE

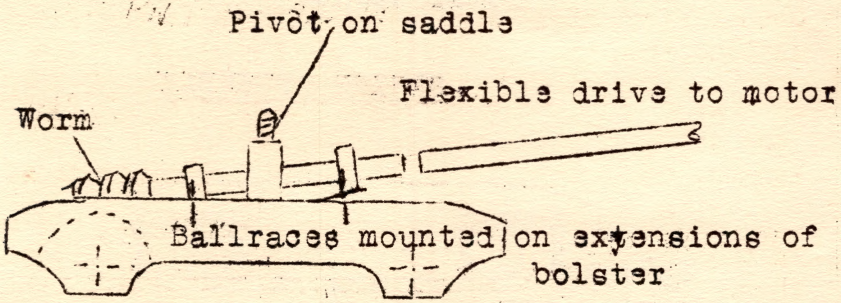


4th STAGE


1/8' x 1/4" bolster with pivot hole
Screwhead on bogie side-plate

5th STAGE

PLAN OF COMPLETE BOGIE



MOTOR OR DRIVING BOGIE

be called a classic in the subject, John Ahearn's book "Miniature Building Construction."

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HEAVY DUTY MOTOR BOGIE.

By IAN G. WEICKHARDT.

An 1102 type electric shunting loco needed two heavy type bogies to be correct scale. They also had to be heavy to hold the rails at low speeds with heavy draw bar loading.

14 gauge brass plate was obtained and marked out. The prototype bogie has large plate sides; Extra heavy end sills (stretchers) bolted to the bogie sides. Journal boxes bear in the plate sides, springing above by heavy leaf springs; these in their turn fixed to coil springs. These coiled springs are bolted to the bogie frame and act as compression springs.

The axle holes were all marked, centre popped, and drilled as accurately as possible with a hand drill. The sides were cut out in the form of rectangles and bolted through with 1"x$\frac{1}{8}$" screws and nuts. The bunch was then formed to the bogie side shape.

The screws were removed and each side cleaned individually.

The leaf springs and journal boxes were brought in the form of axleguards, made of white metal. These were cut apart and shaped to conform with the blueprint, then carefully soldered to the bogie side-plates, using 50-50 solder and baker's fluid with a good hot chisel point shaped soldering iron. Copper right angle lugs were soldered to the frame vertically in line from the ends of the leaf springs.

As a hole was drilled in the horizontal face of these lugs, the springs, which were coupler springs stretched, cut to length, could have their stays soldered into them.

Small copper washers, 3/32" in diameter had holes drilled in them to take the stays (18 gauge brass wire) soldered into them. The springs themselves were soldered to the small copper washers. The spring assemblies were soldered to the lugs so the stays touched the ends of the leaf springs. As the axles may be a little long, the white metal was drilled a little, to take the extra length of axle. A length of angle made of copper was soldered to under the journal boxes.

The centre bolster was $\frac{1}{2}$" x $\frac{1}{4}$" brass stock cut to the appropriate length. Drilled thru the centre for the bogie pivot. The bolster was then drilled and tapped through its length to $\frac{1}{8}$" Whitworth. An $\frac{1}{8}$" x $\frac{1}{4}$" roundhead screw was inserted to within 1 turn of full screw. The head of each was soldered to the inside of the bogie sides after inserting the wheels and axles.

Brake hangers and shoes with cross tie rods can be fixed on: Also the end stretchers cut from the 14 gauge plate and one end soldered firmly to one bogie side, to allow complete bogie articulation.

One was a drive bogie. 2 ball races supported on their outer rims by soldering to extensions of the centre bolster had a shaft pushed through their centres , and a worm, engaging on a gear on the front axle, was sweated to the lower end of the shaft. A flexible drive from the motor, consisting of speedo cable cover coil can be devised and fitted. A special saddle can be made to take the pivot to the loco chassis.

These bogies are only typical of what is actually used on the prototype, and its construction will give ideas on other forms of bogies and ways of producing them.

I only quote certain dimensions because in my case they turned out O.K. for weight and long-wearing qualities. Metals such as brass and copper are only what I found to be workable and solderable. Others of course have their favourite materials and like mine are quite O.K. if they can be soldered.

When soldering the various bits and pieces together I used 50-50 solder, Baker's fluid and a good hot soldering iron. The paste flux was not so good on the lug pieces, but again it is a matter of opinion.

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